

**WE CLAIM:**

1           1.       A method of constructing a data pattern comprising:  
2           calculating an actual value using selected data of the data pattern;  
3           determining a desired value of the actual-value calculation using the selected data;  
4           determining a correction value to be applied to a portion of the selected data;  
5           performing an operation using the correction value and the portion of the selected  
6 data, thereby yielding a replacement value; and

7           making the portion of the selected data equal to the replacement value, thereby  
8 yielding adjusted selected data.

1           2.       The method of claim 1, wherein:  
2           the data pattern comprises a data loop;  
3           the desired value is stored in a first frame of the data loop; and  
4           the actual value is a function of the content of a preceding frame of the data loop.

1           3.       The method of claim 2, wherein the data pattern comprises binary data and the  
2 step of determining the correction value comprises performing an exclusive-Or operation of  
3 the actual value and the desired value.

1           4.       The method of claim 3, wherein the step of performing the operation  
2 comprises performing an exclusive-Or operation of the correction value and the portion of the  
3 selected data.

1           5.       The method of claim 4, wherein the data pattern is used for time-domain  
2 testing.

1           6.       The method of claim 5, wherein the time-domain testing comprises bit-error-  
2 rate testing.

1           7.       The method of claim 4, wherein the data pattern is used for frequency-domain  
2 testing.

1           8.       The method of claim 7, wherein the frequency-domain testing comprises  
2 spectrum analysis.

1           9.       The method of claim 4, wherein the data pattern comprises at least one  
2 Synchronous Optical Network (SONET) frame.

1           10.      The method of claim 9, wherein the step of calculating comprises performing  
2 a Bit Interlace Parity (BIP) calculation.

1           11.      The method of claim 10, wherein:  
2 the data pattern comprises at least a last frame and a first frame;  
3 the desired value is stored in the first frame;  
4 the actual value is calculated on the last frame.

1           12.      The method of claim 10, wherein the data pattern comprises a plurality of  
2 frames and a plurality of the plurality of frames include identical B bytes.

1           13.      The method of claim 11, wherein the last frame and the first frame are the  
2 same frame.

1           14.     The method of claim 10, wherein the desired value comprises at least one of a  
2     SONET B2 byte, a SONET B3 byte, and a SONET B1 byte.

1           15.     The method of claim 9, wherein the number of frames in the data pattern  
2     equals one.

1           16.     The method of claim 4, wherein the data pattern comprises at least one  
2     Synchronous Digital Hierarchy (SDH) frame.

1           17.     The method of claim 16, wherein the step of calculating comprises performing  
2     a Bit Interlace Parity (BIP) calculation.

1           18.     The method of claim 17, wherein:  
2     the data pattern comprises at least a last frame and a first frame;  
3     the desired value is stored in the first frame;  
4     the actual value is calculated on the last frame.

1           19.     The method of claim 17, wherein the data pattern comprises a plurality of  
2     frames and a plurality of the plurality of frames include identical B bytes.

1           20.     The method of claim 18, wherein the last frame and the first frame are the  
2     same frame.

1           21.     The method of claim 17, wherein the desired value comprises at least one of a  
2     SDH B2 byte, a SDH B3 byte, and a SDH B1 byte.

1 22. The method of claim 1, further comprising:  
2 calculating a second actual value using second selected data of the data pattern;  
3 determining a second desired value of the second-actual-value calculation using the  
4 second selected data;  
5 determining a second correction value to be applied to a portion of the second selected  
6 data;  
7 performing an operation using the second correction value and the portion of the  
8 second selected data, thereby yielding a second replacement value; and  
9 making the portion of the second selected data equal to the second replacement value,  
10 thereby yielding adjusted second selected data.

1 23. The method of claim 22, wherein the step of determining the second  
2 correction value comprises performing an exclusive-Or operation of the second actual value  
3 and the second desired value.

1 24. The method of claim 23, wherein the step of performing the operation using  
2 the second correction value comprises performing an exclusive-Or operation of the second  
3 correction value and the portion of the second selected data.

1 25. The method of claim 24, wherein the selected data and the portion of the  
2 second selected data are mutually exclusive.

1 26. The method of claim 1, wherein the selected data is selected from a single  
2 frame of the data pattern.

1           27.     The method of claim 1, further comprising calculating an adjusted actual value  
2     using the adjusted selected data, wherein the adjusted actual value equals the desired value.

1           28.     The method of claim 1, wherein the step of determining the correction value  
2     comprises performing an exclusive-Or operation of the actual value and the desired value.

1           29.     The method of claim 1, wherein the step of performing the operation  
2     comprises performing an exclusive-Or operation of the correction value and the portion of the  
3     selected data.

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1           30.     An error-rate test system comprising:  
2                 a pattern generator adapted to input a finite data pattern comprising at least one frame  
3     to a device under test, wherein the device under test sequentially processes and outputs data  
4     of the input finite data pattern;  
5                 wherein a correction value comprises the result of an exclusive-Or operation of an  
6     actual value and a desired value of a calculation performed on a selected portion of at least  
7     one frame of the finite data pattern;  
8                 wherein a replacement value comprises an exclusive-Or operation of the correction  
9     value and a portion of the selected portion; and  
10                wherein the portion of the selected portion is made equal to the replacement value.

1           31.     The system of claim 30, wherein the data pattern comprises at least one  
2     Synchronous Optical Network (SONET) frame.

1           32.     The system of claim 31, wherein the actual value comprises the result of a Bit  
2     Interlace Parity (BIP) calculation.

1           33.     The system of claim 32 wherein:  
2                 the data pattern comprises at least a last frame and a first frame;  
3                 the desired value is stored in the first frame;  
4                 the actual value is calculated on the last frame.

1           34.     The system of claim 30, wherein the data pattern comprises a plurality of  
2     frames and a plurality of the plurality of frames include identical B bytes.

1           35.     The system of claim 33, wherein the last frame and the first frame are the  
2 same frame.

1           36.     The system of claim 30, wherein the desired value comprises at least one of a  
2 SONET B2 byte, a SONET B3 byte, and a SONET B1 byte.

1           37.     The system of claim 30, wherein the number of frames in the data pattern  
2 equals one

1           38.     The system of claim 30, wherein the data pattern comprises at least one  
2 Synchronous Digital Hierarchy (SDH) frame.

1           39.     The system of claim 38, wherein the actual value comprises the result of a Bit  
2 Interlace Parity (BIP) calculation.

1           40.     The system of claim 39, wherein:  
2 the data pattern comprises at least a last frame and a first frame;  
3 the desired value is stored in the first frame;  
4 the actual value is calculated on the last frame.

1           41.     The system of claim 38, wherein the data pattern comprises a plurality of  
2 frames and a plurality of the plurality of frames include identical B bytes.

1           42.     The system of claim 40, wherein the last frame and the first frame are the  
2 same frame.

1           43.     The system of claim 30, wherein the desired value comprises at least one of a  
2     SDH B2 byte, a SDH B3 byte, and a SDH B1 byte.

1           44.     The system of claim 30, wherein:  
2             a second actual value is calculated using a second selected portion of the at least one  
3     frame;

4             a second desired value of the second-actual-value calculation is determined using the  
5     second selected portion;

6             a second correction value to be applied to a portion of the second selected portion is  
7     determined;

8             an operation is performed using the second correction value and the portion of the  
9     second selected portion, the operation using the second correction value and the portion of  
10    the second selected portion yielding a second replacement value; and

11            the portion of the second selected data is made equal to the second replacement value,  
12    thereby yielding an adjusted second selected portion.

1           45.     The system of claim 44, wherein the determination of the second correction  
2     value comprises performing an exclusive-Or operation of the second actual value and the  
3     second desired value.

1           46.     The system of claim 45, wherein the operation using the second correction  
2     value and the portion of the second selected portion comprises performing an exclusive-Or  
3     operation of the second correction value and the portion of the second selected portion.

1           47.     The system of claim 46, wherein the selected portion and the portion of the  
2     second selected portion are mutually exclusive.

1           48.     The system of claim 30, wherein the selected portion is selected from a single  
2     frame of the data pattern.

1           49.     The system of claim 30, wherein an adjusted actual value using the adjusted  
2     selected data is calculated and the adjusted actual value equals the desired value.

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